ABSTRACT

[75] A power converter that produces variable frequency multiphase AC power from fixed or variable frequency AC power. The converter can be used to drive an AC motor for propulsion applications or other motors and loads that require variable frequency AC power. The power converter system is based on a combination of several power conversion technologies used in a power circuit topology and a regulator control system that allows for higher electrical efficiency, higher power density and lower power distortion to be achieved than is possible from any of the individual technologies. Specifically, the input and output power distortion of a frequency changer is monitored, and a group of high performance inverters are used to inject harmonic currents into a specially designed transformer to neutralize the power distortion to a specified acceptable level. By this neutralization, the power density of a solid-state electric power converter is increased (e.g., by a factor of 5-6) and power quality distortion is reduced (e.g., below 0.1%). These features are especially useful in the electric power conversion markets particularly for surface ship and submarine propulsion drive applications.